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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is included. (AG)

ED 069641

TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

BALLING-MACHINE OPERATOR (textile; tex. prod., n.e.c.) 6-19.110

B-575 S-295

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TM 001 941

U. S. Employment Service
in Cooperation with
North Carolina State Employment Service

February 1964

GATB # 2486

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

BALLING-MACHINE OPERATOR (textile; tex. prod., n.e.c.) 6-19.110

B-575

Summary

The General Aptitude Test Battery, B-1002B, was administered to a final sample of 66 women employed as Balling-Machine Operator 6-19.110 at Pyramid Mills, Bessemer City, North Carolina. The criterion consisted of supervisory ratings. On the basis, of mean scores, standard deviations, correlations with the criterion, job analysis data, and their combined selective efficiency, Aptitudes P-Form Perception, K-Motor Coordination and M-Manual Dexterity were selected for inclusion in the final test norms.

GATB Norms for Balling-Machine Operator 6-19.110, B-575

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
P	CB-1-A CB-1-L	80	P	Part 5 Part 7	80
T	CB-1-G CB-1-K	80	K	Part 8	85
M	CB-1-M CB-1-N	80	M	Part 9 Part 10	80

Effectiveness of Norms

Only 67 percent of the non-test-selected workers used in this study were good workers; if the workers had been test-selected with the above norms, 82 percent would have been good workers. 33 percent of the non-test-selected workers used for this study were poor workers; if the workers had been test-selected with the above norms, only 18 percent would have been poor workers.

TECHNICAL REPORT

I. Purpose

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Balling-Machine Operator 6-19.110.

II. Sample

The GATB, B-1002B, was administered in September 1963 to a final sample of 66 women employed as Balling-Machine Operators 6-19.110 at Pyramid Mills, Bessemer City, North Carolina. The company specializes in Christmas ornaments; therefore, most employees are seasonal. The good workers from previous years are rehired on a merit-seniority basis. New employees are hired on the basis of a personal interview. There are no fixed hiring requirements. Two to four weeks is considered to be adequate training time for new employees. All women in the final sample are considered experienced workers.

TABLE I

Means (M), Standard Deviations (σ), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, and Experience

N = 66	M	σ	Range	r
Age (years)	24.2	6.5	18-49	.188
Education (years)	9.7	1.6	6-12	.111
Experience (months)	17.3	26.2	1-120	.342**

**Significant at the .01 level

III. Job Description

Job Title: Balling-Machine Operator 6-19.110

Job Summary: Operates balling machine to cover Christmas tree ornaments with decorative yarn and to wind twine into ball for retail sale. Completes ornaments by attaching hangers, leaves, and other decoration. Packages ornaments and balls of twine for shipment.

Work Performed: Threads machine. Places supply packages on machine and threads yarn or twine through or around guides and tension devices. Replaces exhausted packages as required. Operates balling machine to cover Christmas tree ornaments (balls, bells, tear drops, and disks) with decorative yarn. Places plastic foam cores on machine spindles. Sets yardage clock so that machine will wind a designated yardage of yarn on core and stop automatically. Holds yarn ends in one hand (on some machines, winds yarn around spindle or plastic object being covered) and pushes start button with the other. Uses brush to daub fast drying glue at end of each ornament to hold yarn in place. Breaks yarn and removes covered ornaments from spindles. Attaches hangers and/or leaves to ornaments by dipping stems into glue and inserting into existing holes. Inspects ornament for flaws. Operates balling machine to wind thread, twine, or cord from large packages to small balls for such uses as kite string, crochet thread, and wrapping twine. Places cardboard cores on spindles, slashes cores with knife and inserts ends of twine into slashes. Sets clock so that a designated yardage of twine will be wound onto core and machine will stop automatically. Pushes button to start machine. Cuts twine with knife and tucks in ends. Removes balls of twine from machine and tapes labels in place around balls. Packs products in plastic bags or boxes and stamps identifying information on boxes. Keeps simple production records.

IV. Experimental Battery

All the tests of the GATB, B-1002B , were administered to the sample group.

V. Criterion

The criterion data collected consisted of two sets of independent ratings made by the first-line supervisor on USES Form SP-21 "Descriptive Rating Scale." A period of at least two weeks elapsed between the first and second ratings. The rating scale consisted of nine items covering different aspects of job performance, with five alternatives for each item. Weights of one through five, indicating the degree of job proficiency obtained, were assigned to the alternatives. A reliability coefficient of .78 was obtained for the criterion. Therefore, the two sets of ratings were combined, resulting in a distribution of final criterion scores of 24-79 with a mean of 58.4 and a standard deviation of 10.9.

VI Qualitative and Quantitative Analyses

A. Qualitative Analysis

On the basis of the job analysis data, the following aptitudes were rated "important" for success in this occupation:

Form Perception (P) - required in inspecting finished ornaments and recognizing flaws, and in determining correct placement of decorations.

Motor Coordination (K) - required in the manipulation of balls, cores and other small attachments.

Finger Dexterity (F) - required in threading machine, handling fragile ornaments, setting yardage clock, taping labels and attaching hangers and decorations.

Manual Dexterity (M) - required in placing supply packages on machine, operating balling machine, packing products in plastic bags or boxes and stamping identifying information on boxes.

On the basis of the job analysis data, V-Verbal Aptitude was rated "irrelevant" for successfully performing the duties of this job.

B. Quantitative Analysis:

TABLE II

Means (M), Standard Deviations (σ), and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB; N = 66

Aptitudes	M	σ	r
G-Intelligence	78.1	12.9	.020
V-Verbal Aptitude	85.1	10.2	.106
N-Numerical Aptitude	76.4	15.6	.193
S-Spatial Aptitude	85.3	14.1	-.225
P-Form Perception	93.4	14.9	.107
Q-Clerical Perception	92.5	10.4	.181
K-Motor Coordination	95.8	16.5	.249*
F-Finger Dexterity	94.4	18.1	.028
M-Manual Dexterity	108.3	17.3	.160

*Significant at the .05 level

C. Selection of Test Norms:

TABLE III

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important					X		X	X	X
Irrelevant		X							
Relatively High Mean					X		X	X	X
Relatively Low Sigma	X	X		X		X			
Significant Correlation with Criterion							X		
Aptitudes to be Considered for Trial Norms					P		K	F	M

Trial norms consisting of various combinations of Aptitudes P, K, F and M with appropriate cutting scores were evaluated against the criterion by means of the Phi Coefficient technique. A comparison of the results showed that B-1002 norms consisting of P-80, K-85 and M-80 had the best selective efficiency.

VII. Validity of Norms (concurrent)

The validity of the norms was determined by computing a Phi Coefficient between the test norms and the criterion and applying the Chi Square test. The criterion was dichotomized by placing 33 percent of the sample in the low criterion group because this percent was considered to be the unsatisfactory or marginal workers.

Table IV shows the relationship between test norms consisting of Aptitudes P, K and M with critical scores of 80, 85 and 80, respectively, and the dichotomized criterion for Balling-Machine Operator 6-19.110. Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE IV

Validity of Test Norms for Balling-Machine Operator 6-19.110
(P-80, K-85, M-80)

N = 66	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	11	33	44
Poor Workers	15	7	22
Total	26	40	66

Phi Coefficient = .417
χ^2 = 11.477
P/2 < .0005

The data in the above table indicate a significant relationship between the test norms and the criterion for the sample.

VIII. Conclusions

On the basis of the results of this study, Aptitudes P, K and M with minimum scores of 80, 85 and 80, respectively, have been established as B-1002 norms for Balling-Machine Operator 6-19.110. The equivalent B-1001 norms consist of P-80, T-80 and M-80.

IX. Determination of Occupational Aptitude Pattern

The data for this study met the requirements for incorporating the occupation studied into OAP-31 which is shown in Section II of the Guide to the Use of the General Aptitude Test Battery, January 1962.